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10/015,768	12/17/2001	Kie Jin Park	P67414US0	4427

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EXAMINER
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ART UNIT	PAPER NUMBER
2114	4

DATE MAILED: 07/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 December 2001*.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12/17/01* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some *   c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date *3*.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1.   Claim 12 is objected to because of the following informalities: Line 6, "in server"

is unclear. The examiner asserts that this is a typographical error and should read, "in

service." Appropriate correction is required.

Claim Rejections - 35 USC § 102

2.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.   Claims 1, 2, 5-11 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated

by Fulton, III et al. (5,715,386).

As in claim 1, Fulton discloses a method for improving software availability of a

cluster computer system including a number of primary servers (nodes) and spare servers

(nodes) (column 2: lines 11-23 and figure 2), said method comprising the following steps

of:

Collecting system state information about the number of primary servers to

monitor unstableness of the servers (column 9: line 62-column 10: line 8);

If at least one of the servers is judged unstable as a result of monitoring (node fails), judging existence of a spare server or other primary server having spare capacity (column 14: lines 34-47). (If the node does not have spare capacity, it has failed and the failure would be broadcast. Otherwise a backup node is known to have spare capacity);

If at least one of the spare servers or the primary servers having spare capacity exists, duplexing all processes of the unstable primary server to the spare server or the other primary server having spare capacity according to a currently set operation mode (column 10: lines 5-47); and

Upon completing duplexing, providing the unstable server with a system rejuvenation control signal for executing rejuvenation (column 10: lines 47). (Since a node can return to service some form of rejuvenation must occur to make the failed node once again functional. In order for the rejuvenation to occur, some form of rejuvenation control signal must be existent in the system.)

As in claim 2, Fulton discloses a method for improving software availability of a cluster computer system according to claim 1, wherein said system state information contains at least one of group including operational load, continuous running time, memory usage, buffer usage of the primary server (column 9: lines 67 and column 3: lines 40-67). (The daemon monitors processes local to each node and specifically monitors the continuous running time of a processes.)

As in claim 5, Fulton discloses a method for improving software availability of a

cluster computer system according to claim 1, wherein said step of duplexing comprises

the steps of:

If the current mode is set as the active/active mode, selecting any of the primary

servers having spare capacity; and

Duplexing all the processes of the unstable primary server to the selected primary

server having spare capacity (figure 2 and column 11: line 54-column 12: line 62)

As in claim 6, Fulton discloses a method for improving software availability of a

cluster computer system according to claim 1, wherein said step of executing

rejuvenation comprises the steps of:

If the primary server subjected to rejuvenation is completed in duplexing, judging

if to execute a rejuvenation command according to operational load and continuous

running time of the primary server subjected to rejuvenation;

If it is judged to execute the rejuvenation command as a result of said step of

judging, canceling a list of the primary server subjected to rejuvenation from an available

server list (column 10: lines 5-8);

Upon switching the duplexed spare server to the primary server, executing

rejuvenation of the primary server subjected to rejuvenation; and

Upon completing rejuvenation, registering the rejuvenation-completed primary

server in the available server list as a spare server (column 10: lines 44-60).

As in claim 7, Fulton discloses a method for improving software availability of a

cluster computer system according to claim 6, wherein said rejuvenation of the primary

server subjected to rejuvenation includes file system clearing, buffer clearing, memory

clearing and restart (column 10: lines 45-47). (Since a node can return to service some

form of rejuvenation must occur to make the failed node once again functional. The

rejuvenation and rebooting of a node includes such clearing steps.)

As in claim 8, Fulton discloses an apparatus for improving software availability of

a cluster computer system including a number of primary servers (nodes) and spare

servers (column 2: lines 11-23 and figure 2), said apparatus comprising:

System monitoring means for collecting system state information about the

number of primary servers to grasp an unstable state of each of the servers (column 9:

line 62-column 10: line 8);

Cluster controlling means for providing a control signal for duplexing all

processes of a primary server to a spare server or other primary server having spare

capacity according to a currently set operation mode if the primary server is unstable

(node fails) as a result of system monitoring in said system monitoring means (column

14: lines 34-47). (If the node does not have spare capacity, it has failed and the failure

would be broadcast. Otherwise a backup node is known to have spare capacity), and for

providing the unstable primary server with a rejuvenation signal for system rejuvenation

if the unstable primary server maintains an unstable system state for a certain time period

(column 10: lines 45-47). (Since a node can return to service some form of rejuvenation

must occur to make the failed node once again functional. In order for the rejuvenation

to occur, some form of rejuvenation control signal must be existent in the system.); and

Duplexing means for duplexing all processes of the unstable primary server to the

spare server or the other server having spare capacity according to a duplexing control

signal about the set mode provided from said cluster controlling means (column 10: lines

5-47).

As in claim 9, Fulton discloses an apparatus for improving software availability of

a cluster computer system according to claim 8, wherein said system monitoring means

comprises:

A system state information collecting block for monitoring a system state of each

of the primary servers to collect state information of the each server (column 9: line 62-

column 10: line 8); and

A rejuvenation command producing block for judging existence of an unstable

primary server according to system state information collected in said system state

information collecting block, and if any of the primary servers is unstable, producing a

rejuvenation command signal for rejuvenation of unstable software of the unstable

primary server and providing the same to said duplexing means (column 10: lines 47).

(When a node fails, it is restarted and can return to service. Since a node can return to

service some form of rejuvenation must occur to make the failed node once again

functional. In order for the rejuvenation to occur, some form of rejuvenation control

signal must be existent in the system.)

As in claim 10, Fulton discloses an apparatus for improving software availability

of a cluster computer system according to claim 8, wherein said system state information

contains at least one of group including operational load, continuous running time,

memory usage, buffer usage of the primary server (column 9: lines 67 and column 3:

lines 40-67). (The daemon monitors processes local to each node and specifically

monitors the continuous running time of a processes.)

As in claim 11, Fulton discloses an apparatus for improving software availability

of a cluster computer system according to claim 8, wherein said cluster controlling means

includes registering means for canceling the unstable primary server from an available

server list when the unstable primary server is duplexed to the spare server or the other

primary server having spare capacity in said duplexing means, and upon completing

rejuvenation of the unstable primary server according to the rejuvenation signal, re-

registering the rejuvenation-completed primary server in the available server list (column

10: lines 5-10 and column 10: lines 44-60).

As in claim 14, Fulton discloses a record medium readable by a digital processing

apparatus and containing programs of command languages which can be executed by the

digital processing apparatus for execution of a method for improving software

availability of a cluster computer system including a number of primary servers (nodes)

and spare servers (column 2: lines 11-23 and figure 2), said programs in the record

medium can be executed in the following steps of:

Collecting system state information about the number of primary servers to

monitor unstableness of the servers (column 9: line 62-column 10: line 8);

If at least one of the servers is judged unstable as a result of monitoring (node

fails), judging existence of a spare server or other primary server having spare capacity

(column 14: lines 34-47). (If the node does not have spare capacity, it has failed and the

failure would be broadcast. Otherwise a backup node is known to have spare capacity);

If at least one of the spare servers or the primary servers having spare capacity

exists, duplexing all processes of the unstable primary server to the spare server or the

other primary server having spare capacity according to a currently set operation mode

(column 10: lines 5-47); and

Upon completing duplexing, providing the unstable server with a system

rejuvenation control signal for executing rejuvenation (column 10: lines 45-47). (Since a

node can return to service some form of rejuvenation must occur to make the failed node

once again functional. In order for the rejuvenation to occur, some form of rejuvenation

control signal must be existent in the system.)

4.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by
another filed in the United States before the invention by the applicant for patent or (2) a patent granted
on an application for patent by another filed in the United States before the invention by the applicant
for patent, except that an international application filed under the treaty defined in section 351(a) shall
have the effects for purposes of this subsection of an application filed in the United States only if the
international application designated the United States and was published under Article 21(2) of such
treaty in the English language.

5.   Claims 1-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Harper et

al. (2003/0036882).

As in claim 1, Harper discloses a method for improving software availability of a

cluster computer system including a number of primary servers (primary nodes) and

spare servers (secondary nodes) (paragraphs 3 and 36), said method comprising the

following steps of:

Collecting system state information about the number of primary servers to

monitor unstableness of the servers (paragraph 38) (Failure prediction involves collecting

system state information to monitor the unstableness.);

If at least one of the servers is judged unstable as a result of monitoring (node

fails or failure is predicted), judging existence of a spare server or other primary server

having spare capacity (paragraphs 46-49 and paragraph 68);

If at least one of the spare servers or the primary servers having spare capacity

exists, duplexing all processes of the unstable primary server to the spare server or the

other primary server having spare capacity according to a currently set operation mode

(paragraphs 3 and 11); and

Upon completing duplexing, providing the unstable server with a system

rejuvenation control signal for executing rejuvenation (paragraphs 59-64). (Since

rejuvenation can occur, some form of rejuvenation control signal must be existent in the

system.)

As in claim 2, Harper discloses a method for improving software availability of a

cluster computer system according to claim 1, wherein said system state information

contains at least one of group including operational load, continuous running time,

memory usage, buffer usage of the primary server (paragraph 51). (The failure predictor

predicts any problem of the primary node that can be predicted which would include

tracking such things as operational load, continuous running time and memory and buffer

usage.)

As in claim 3, Harper discloses a method for improving software availability of a

cluster computer system according to claim 1, wherein said set operation mode in said

step of duplexing includes:

An active/standby mode in which a spare server exists without participating

service in practice for being used in duplexing (paragraph 37) (When a node is the

secondary node, it is in an active standby mode.); and

An active/active mode in which all of the servers constituting the cluster

participate in service while mutually performing the role of the spare servers (paragraph

65 and figure 5A).

As in claim 4, Harper discloses a method for improving software availability of a

cluster computer system according to claim 1, wherein said step of duplexing comprises

the steps of:

If the current mode is set as the active/standby mode, selecting any of the sparing

servers (paragraph 37) (When a node is the secondary node, it is in an standby mode.

When the primary node fails); and

Duplexing all the processes of the unstable primary server to the selected spare

server (paragraphs 66, 69 and 70 and figure 5B).

As in claim 5, Harper discloses a method for improving software availability of a

cluster computer system according to claim 1, wherein said step of duplexing comprises

the steps of:

If the current mode is set as the active/active mode, selecting any of the primary

servers having spare capacity; and

Duplexing all the processes of the unstable primary server to the selected primary

server having spare capacity (paragraphs 39) (Secondary nodes may or may not have

applications running on them and therefore are also primary nodes and the secondary

node must have spare capacity.)

As in claim 6, Harper discloses a method for improving software availability of a

cluster computer system according to claim 1, wherein said step of executing

rejuvenation comprises the steps of:

If the primary server subjected to rejuvenation is completed in duplexing, judging

if to execute a rejuvenation command according to operational load and continuous

running time of the primary server subjected to rejuvenation;

If it is judged to execute the rejuvenation command as a result of said step of

judging, canceling a list of the primary server subjected to rejuvenation from an available

server list;

Upon switching the duplexed spare server to the primary server, executing

rejuvenation of the primary server subjected to rejuvenation; and

Upon completing rejuvenation, registering the rejuvenation-completed primary

server in the available server list as a spare server (paragraphs 63 and 64). (A failed

server is brought back up as a secondary node and is therefore registered and listed as an

available spare server.)

As in claim 7, Harper discloses a method for improving software availability of a

cluster computer system according to claim 6, wherein said rejuvenation of the primary

server subjected to rejuvenation includes file system clearing, buffer clearing, memory

clearing and restart (paragraphs 63 and 64). (The rejuvenation and rebooted includes

such clearing steps.)

As in claim 8, Harper discloses an apparatus for improving software availability

of a cluster computer system including a number of primary servers (primary nodes) and

spare servers (secondary nodes) (paragraphs 3 and 36), said apparatus comprising:

System monitoring means for collecting system state information about the

number of primary servers to grasp an unstable state of each of the servers (paragraph 38)

(Failure prediction involves collecting system state information to monitor the

unstableness.);

Cluster controlling means for providing a control signal for duplexing all processes of a primary server to a spare server or other primary server having spare capacity according to a currently set operation mode if the primary server is unstable (node fails or failure is predicted) as a result of system monitoring in said system monitoring means, and for providing the unstable primary server with a rejuvenation signal for system rejuvenation if the unstable primary server maintains an unstable system state for a certain time period (paragraphs 46-49 and 59-64) (Since rejuvenation can occur, some form of rejuvenation control signal must be existent in the system.).); and

Duplexing means for duplexing all processes of the unstable primary server to the spare server or the other server having spare capacity according to a duplexing control signal about the set mode provided from said cluster controlling means (paragraphs 3 and 11).

As in claim 9, Harper discloses an apparatus for improving software availability of a cluster computer system according to claim 8, wherein said system monitoring means comprises:

A system state information collecting block (failure predictor) for monitoring a system state of each of the primary servers to collect state information of the each server (paragraph 38) (Failure prediction involves collecting system state information of each node to monitor its unstableness.); and

A rejuvenation command producing block for judging existence of an unstable primary server according to system state information collected in said system state

information collecting block, and if any of the primary servers is unstable, producing a

rejuvenation command signal for rejuvenation of unstable software of the unstable

primary server and providing the same to said duplexing means (paragraphs 59-64).

(Since rejuvenation can occur, some form of rejuvenation control signal must be existent

in the system.)

As in claim 10, Harper discloses an apparatus for improving software availability

of a cluster computer system according to claim 8, wherein said system state information

contains at least one information of group including operation load, continuous running

time, memory usage, buffer usage of the servers (paragraph 51). (The failure predictor

predicts any problem of the primary node that can be predicted which would include

tracking such things as operational load, continuous running time and memory and buffer

usage.)

As in claim 11, Harper discloses an apparatus for improving software availability

of a cluster computer system according to claim 8, wherein said cluster controlling means

includes registering means for canceling the unstable primary server from an available

server list when the unstable primary server is duplexed to the spare server or the other

primary server having spare capacity in said duplexing means, and upon completing

rejuvenation of the unstable primary server according to the rejuvenation signal, re-

registering the rejuvenation-completed primary server in the available server list

(paragraphs 63 and 64). (A failed server is brought back up as a secondary node and is

therefore registered and listed as an available spare server.)

As in claim 12, Harper discloses an apparatus for improving software availability

of a cluster computer system according to claim 8, wherein the operation mode set in said

cluster controlling means includes an active/standby mode having a spare server existing

without practically participating service for being used in duplexing (paragraph 37); and

An active/active mode in which all the servers constituting the cluster participate

in service while mutually performing the role of the spare servers (paragraphs 39)

(Secondary nodes may or may not have applications running on them and therefore

participate in service while performing the role of the spare servers.)

As in claim 13, Harper discloses an apparatus for improving software availability

of a cluster computer system according to claim 8, wherein said duplexing means

comprises:

A server selecting block for selecting a spare server or a primary server having

spare capacity according to the operation mode set to said cluster controlling means

(paragraph 68); and

A duplexing block for duplexing all the processes of the unstable primary server

to the primary server having spare capacity selected by said primary server selecting

block when the operation mode is set as an active/active operation mode, and for

duplexing all the processes of the unstable primary server to the spare server selected by

said primary server selecting block when the operation mode is set as an active/standby

operation mode (paragraphs 39). (Secondary nodes may or may not have applications

running on them and therefore are also primary nodes and the secondary node must have spare capacity.)

As in claim 14, Harper discloses a record medium readable by a digital processing apparatus and containing programs of command languages which can be executed by the digital processing apparatus for execution of a method for improving software availability of a cluster computer system including a number of primary servers (nodes) and spare servers (secondary nodes) (paragraphs 3 and 36 and claim 38), said programs in the record medium can be executed in the following steps of:

Collecting system state information about the number of primary servers to monitor unstableness of the servers(paragraph 38) (Failure prediction involves collecting system state information to monitor the unstableness.);

If at least one of the servers is judged unstable as a result of monitoring (node fails or failure is predicted), judging existence of a spare server or other primary server having spare capacity (paragraphs 46-49 and paragraph 68);

If at least one of the spare servers or the primary servers having spare capacity exists, duplexing all processes of the unstable primary server to the spare server or the other primary server having spare capacity according to a currently set operation mode (paragraphs 3 and 11); and

Upon completing duplexing, providing the unstable server with a system rejuvenation control signal for executing rejuvenation (paragraphs 59-64). (Since rejuvenation can occur, some form of rejuvenation control signal must be existent in the system.)

Conclusion

6.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

See PTO-892.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Anne L Damiano whose telephone number is (703) 305-

8010. The examiner can normally be reached on M-F 9-6:30 first Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Robert Beausoliel can be reached on (703) 305-9713. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status

information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see http://pair-direct.uspto.gov. Should you

have questions on access to the Private PAIR system, contact the Electronic Business

Center (EBC) at 866-217-9197 (toll-free).

SCOTT BADERMAN
PRIMARY EXAMINER

ALD